Remarks

Claims 1-13 and 15-22 are pending in the application. Claims 1-7, 9-13, 15, 16, 21 and 22 are rejected. Claims 8 and 17-20 are objected to, and allowable if rewritten in independent form. All rejections and objections are respectfully traversed.

> Claims 1 – 7 and 9 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shattil (USPAP 2002/0034191) in view of Sartori et al (Neural Network Training Via Quadratic Optimization, Circuit and Systems, 1992 ISCAS '92 Proceedins , 1992 International Symposium).

Shattil describes a conventional impulse radio system. Such systems are not subject to a spectral mask where power limits are defined as a function of frequency, see the FCC mask of Figure 1 in the present application. Therefore, Shattil is not concerned with shaping a spectrum of ultrawide bandwidth (UWB) pulses, particularly for indoor channels.

Shattil does not describe random delays. In fact, at paragraph [0370], Shattil teaches quite the opposite. Shattil uses uniform delays:

> shift values, such as $e^{in\Delta\phi}{}_k$. The process of providing a uniform delay to each of the carriers applies incremental phase-shift values (such as $e^{in\Delta\phi}{}_k$) to the carriers. In an

Shattil does not optimize, jointly, weights and delays as a solution to a quadratic optimization problem to approximately minimize a deviation of

the spectrum from an ultrawide bandwidth spectral mask, in which the spectral mask is designed for indoor channels and limits power as a function of frequency in the spectral mask.

Shattil does not orthogonalize and normalize the set of basis pulses to optimize the delays. Shattil's pulses have uniform delays.

Shattil does not describe weighting the set of ultrawide bandwidth basis pulses by the weights, delaying the set of basis pulses by the random delays, and combining linearly the weighted and delayed basis pulses to conform the spectrum to the ultrawide bandwidth spectral mask, and wherein the weights and delays are fixed over time for the spectral mask, and wherein the basis pulses are selected from a set of basis pulses by a combinatorial optimization using training spectral masks.

For all of the above, see paragraph [0370] cited by the Examiner as the only basis for rejection. At paragraph [0370], Shattil states:

> **[0370]** **FIG. 19** shows a method for generating CI signals. An information signal $s_k(t)$ (from an input data source **101**) intended for a k^{th} user is modulated onto N carriers in a first modulation step **204A**. In a second modulation step **204B**, complex weights are applied to the modulated carriers. The complex weights may include phase shifts (or delays). Unlike a chip sequence in MC-CDMA (which uses binary values, such as ±1), CI signals use incremental (n) phase-shift values, such as $e^{in\Delta\phi_k}$. The process of providing a uniform delay to each of the carriers applies incremental phase-shift values (such as $e^{in\Delta\phi_k}$) to the carriers. In an optional third modulation step **204C**, additional weights a_{nk} are applied to the carriers. The weights a_{nk} may include windowing weights, channel-compensation values, code values, and/or weight values that facilitate signal separation by cancellation or constellation methods at a receiver (not shown). The weights a_{nk} may include a diversity operation P(q). The modulation steps **204A**, **204B**, and **204C** may be performed in any order and may be combined. The carriers are combined **210**, optionally up converted **215**, and coupled **250** into a communication channel **99**.

and Applicants cannot find any of the claimed limitations in this paragraph cited by the Examiner.

Sartori describes quadratic optimization to find the weights of a single neuron or a single-layer neural network. Claimed is an joint optimization of weights and delays to approximately minimize a deviation of the spectrum from an ultrawide bandwidth spectral mask. Sartori's work predates the FCC definition of the ultrawide bandwidth spectral mask by almost ten years. It would have been impossible for Sartori to have any knowledge of the spectral mask. Also, it is not possible to combine Sartori with Shattil. First, neural networks have nothing to do with radio transmitters. Second, Shattil does not have a spectrum mask or UWB pulses.

Regarding claim 2, component 204A does not describe shifting frequencies of the weighted and randomly delayed ultrawide bandwidth basis pulses before the combining. The sum total description of the component 204A is a modulation step:

> **[0370]** **FIG. 19** shows a method for generating CI signals. An information signal $s_k(t)$ (from an input data source **101**) intended for a k^{th} user is modulated onto N carriers in a first modulation step **204A**. In a second modulation step **204B**,

As per claim 4-7, there are no UWB basis pulses or spectrum masks in Shattil, see paragraph [0370].

Regarding claim 9, the Examiner cites Adams ("Regarding claim 9, which inherits the limitations of claim 1, Shattil in view of Adams ....") without

providing a description of what Adams is and what in Adams makes the invention obvious. The rejection of claim 9 is improper rejection and should be withdrawn.

Regarding claims 10-14 and 22, the arguments above hold.

Claims 15 and 16 are rejected based on an unknown reference Adams, as was claim 9. These rejections should be withdrawn.

The limitations of allowable claim 20 have been added to claim 1.

It is believed that this application is now in condition for allowance. A notice to this effect is respectfully requested. Should further questions arise concerning this application, the Examiner is invited to call Applicants' attorney at the number listed below. Please charge any shortage in fees due in connection with the filing of this paper to Deposit Account 50-0749.

Respectfully submitted,
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